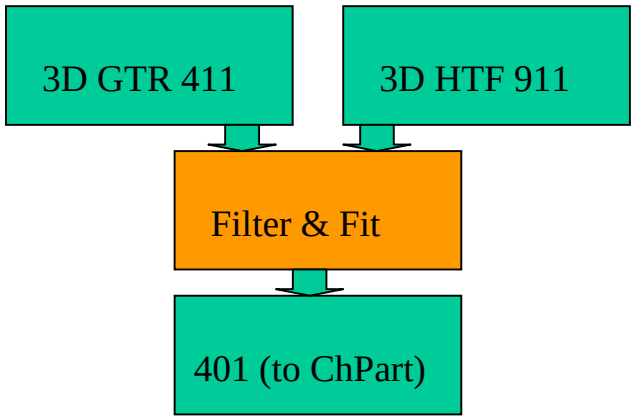
Tracking Efficiency in Z→ee

- Axial only CFT tracks
  - a lot of people worked hard to fit them into the d0reco
- Efficiency:
- p13.01
  - 3D: gtr+htf
  - 2D: gtr (chunk 113)
- patched p13
  - 3D: gtr + patched htf
  - 2D: gtr (chunk 113)
- plans

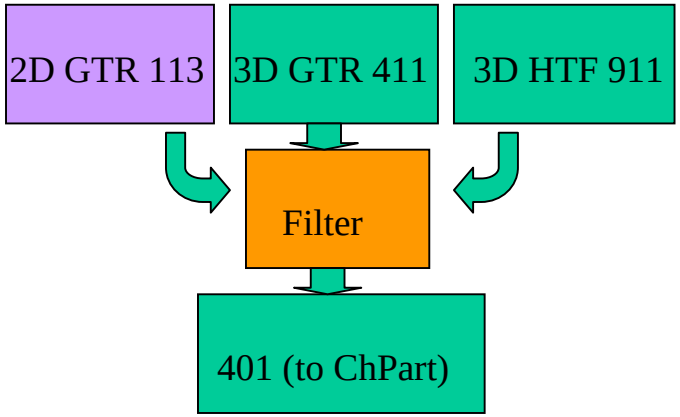
Axial Only tracks

- Present only in data path
- Z_{DCA} = tg λ = 0
- Vertex code filters them by requiring at least on SMT hit on a track
- ChargedParticle assigns tg λ = 1000 (and some non-zero errors on it and Z_{DCA})
- Physics objects are not affected since they match tracks to other subdetectors in eta-phi

p11



p13



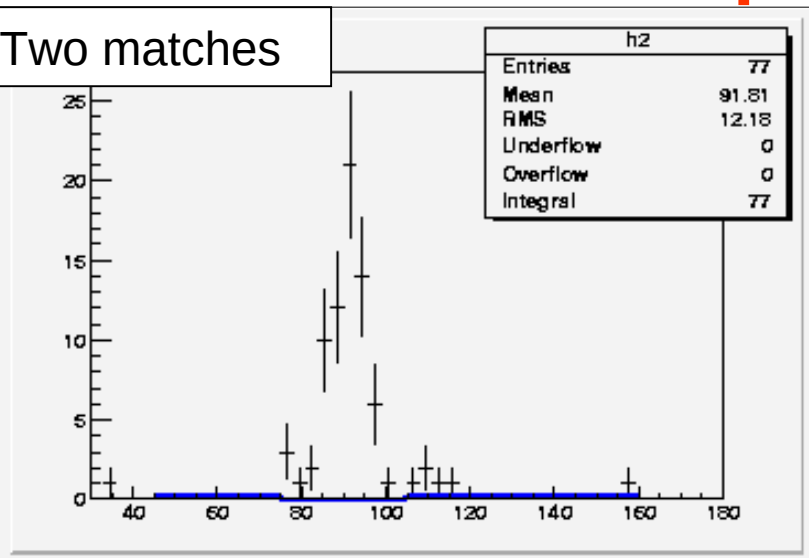
Sample and Track matching

- CC-CC Z events from April to August, picked with calorimeter information
- pT correction: if no SMT hits, correct pT using DCA (as in p10.15 for ICHEP data)
- Match:
  - $\Delta(\varphi_{EM}, \varphi_{track}) < 50$ mrad
  - pT > 5, 15 GeV
- "Fake" match:
  - $\Delta(\varphi_{EM}+\pi/2, \varphi_{track}) < 50$ mrad
  - pT > 5, 15 GeV
- Efficiency

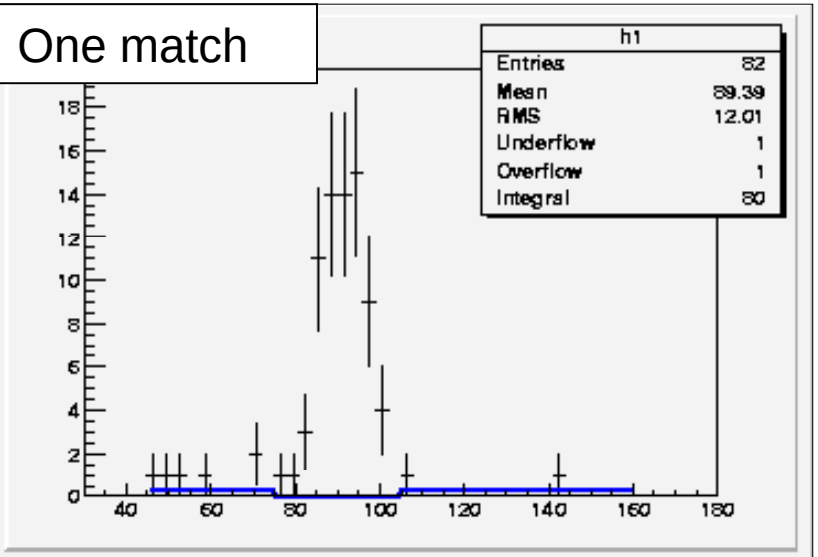
$$\varepsilon_{track} = \frac{2 \cdot N_2 + N_1}{2 \cdot (N_2 + N_1 + N_0)}$$

p13

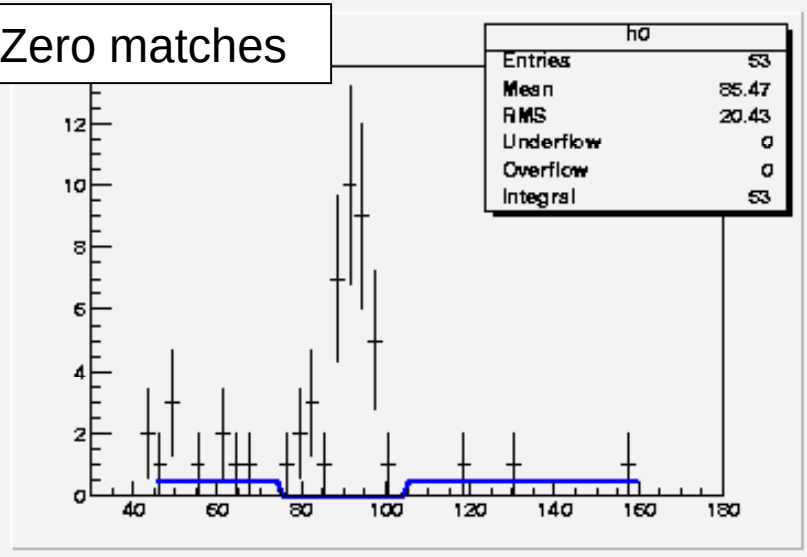
Two matches



One match



Zero matches



3D tarcks >15 GeV

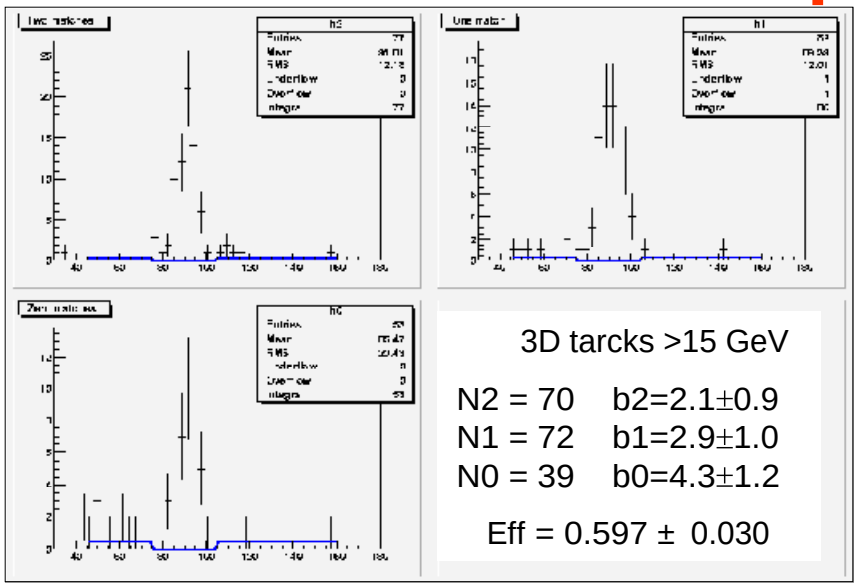
N2 = 70 b2=2.1±0.9

N1 = 72 b1=2.9±1.0

N0 = 39 b0=4.3±1.2

Eff = 0.597 ± 0.030

p13



3D tarcks >15 GeV

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N0 = 39 b0=4.3±1.2

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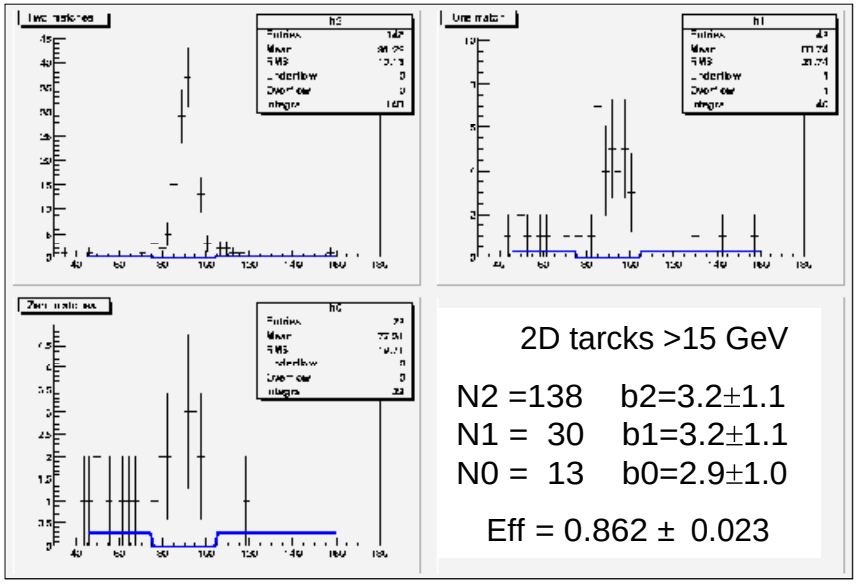
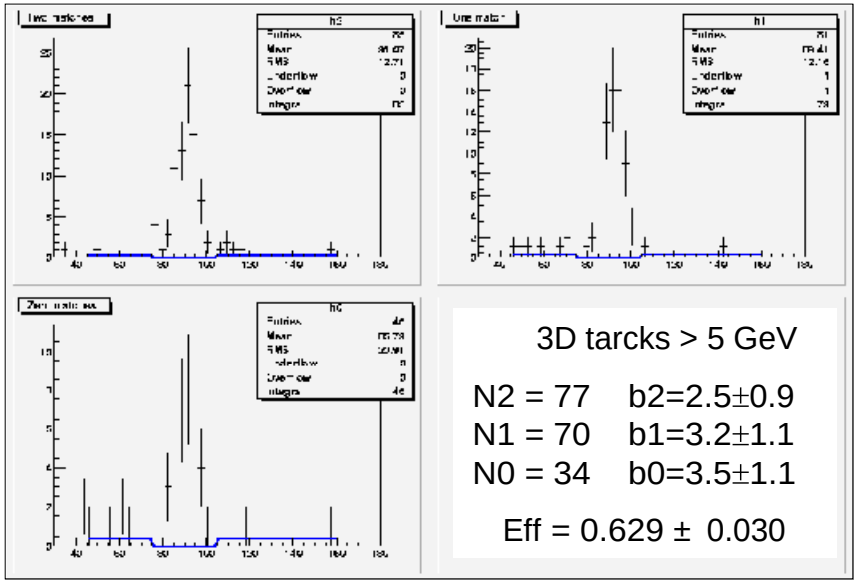


2D tarcks >15 GeV

N2 =138 b2=3.2±1.1
N1 = 30 b1=3.2±1.1
N0 = 13 b0=2.9±1.0

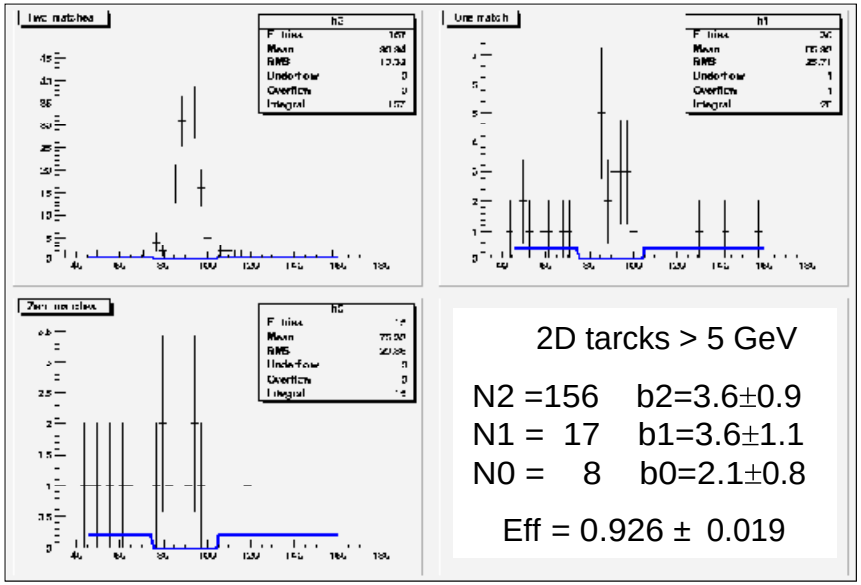
Eff = 0.862 ± 0.023



3D tarcks > 5 GeV

N2 = 77 b2=2.5±0.9
N1 = 70 b1=3.2±1.1
N0 = 34 b0=3.5±1.1

Eff = 0.629 ± 0.030

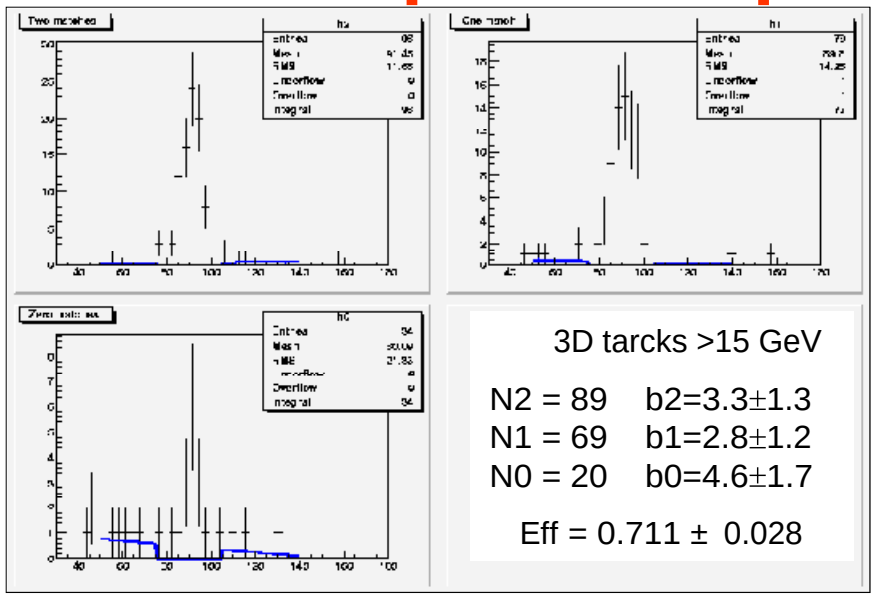


2D tarcks > 5 GeV

N2 =156 b2=3.6±0.9
N1 = 17 b1=3.6±1.1
N0 = 8 b0=2.1±0.8

Eff = 0.926 ± 0.019

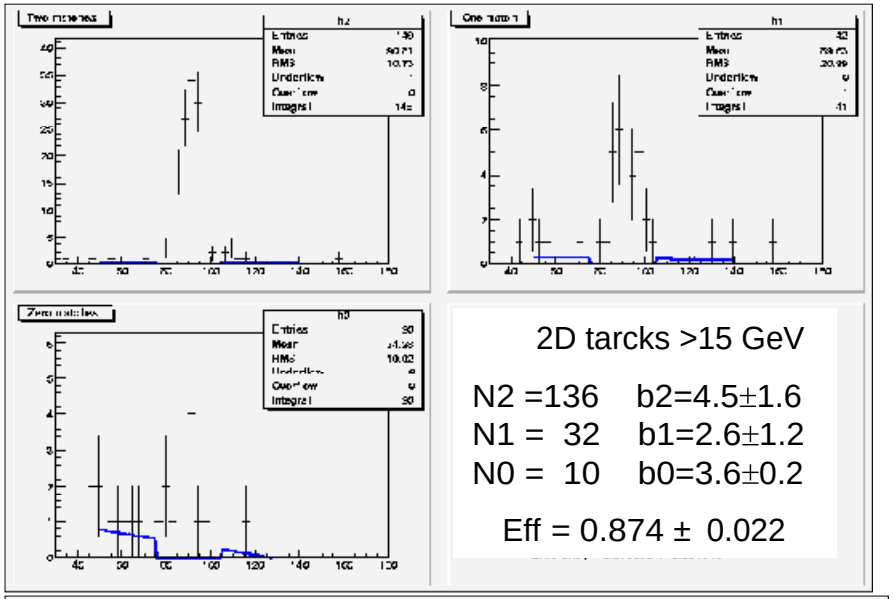
p13 + patched htf



3D tarcks >15 GeV

N2 = 89 b2=3.3±1.3
N1 = 69 b1=2.8±1.2
N0 = 20 b0=4.6±1.7

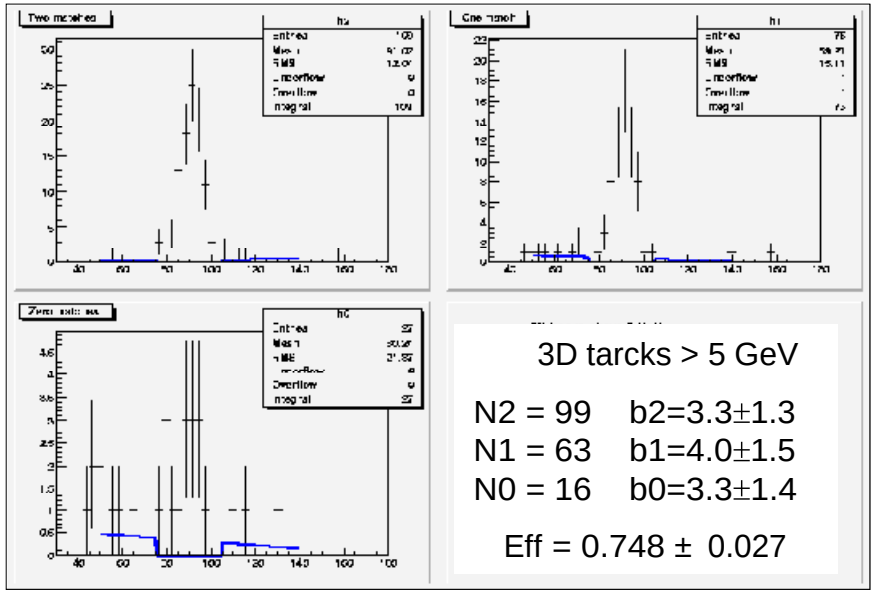
Eff = 0.711 ± 0.028



2D tarcks >15 GeV

N2 =136 b2=4.5±1.6
N1 = 32 b1=2.6±1.2
N0 = 10 b0=3.6±0.2

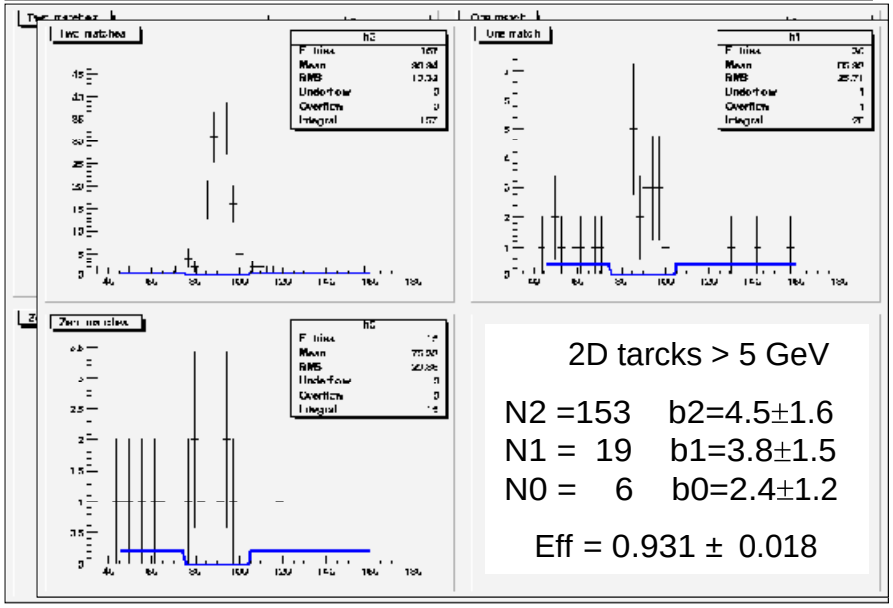
Eff = 0.874 ± 0.022



3D tarcks > 5 GeV

N2 = 99 b2=3.3±1.3
N1 = 63 b1=4.0±1.5
N0 = 16 b0=3.3±1.4

Eff = 0.748 ± 0.027

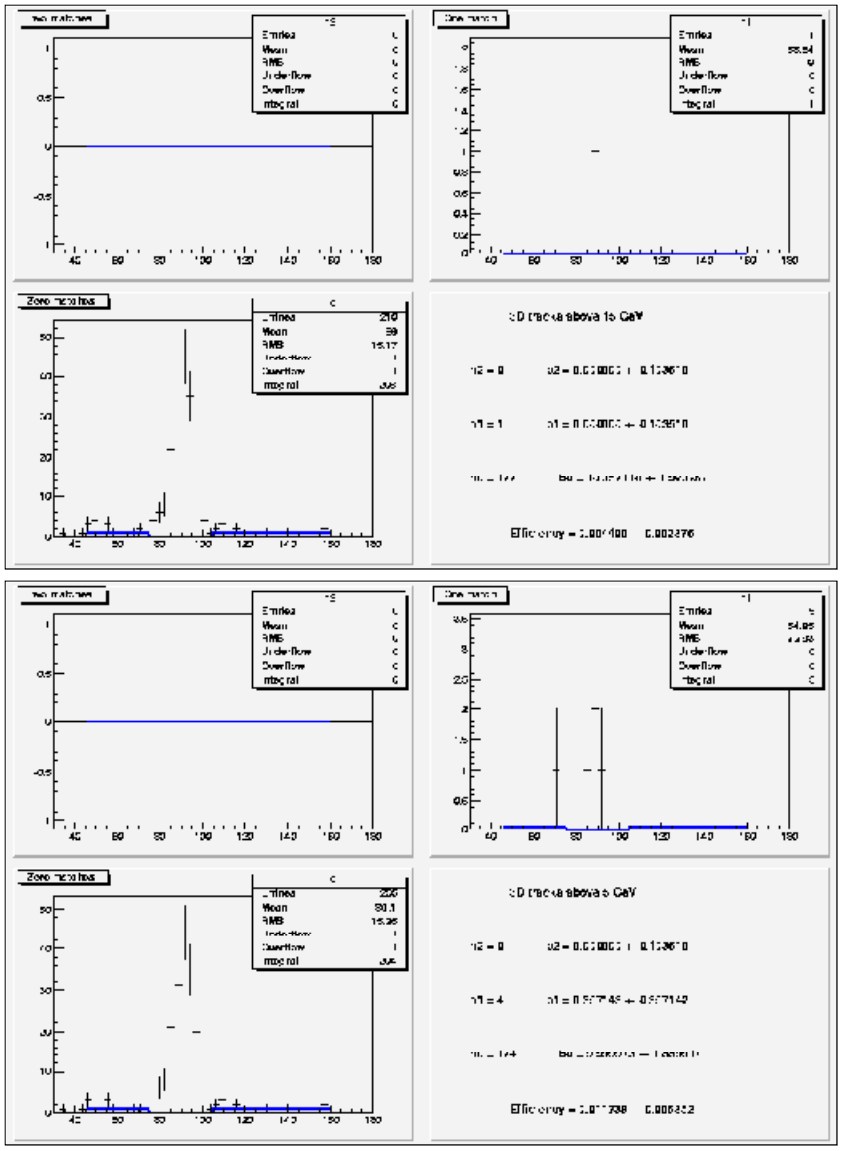


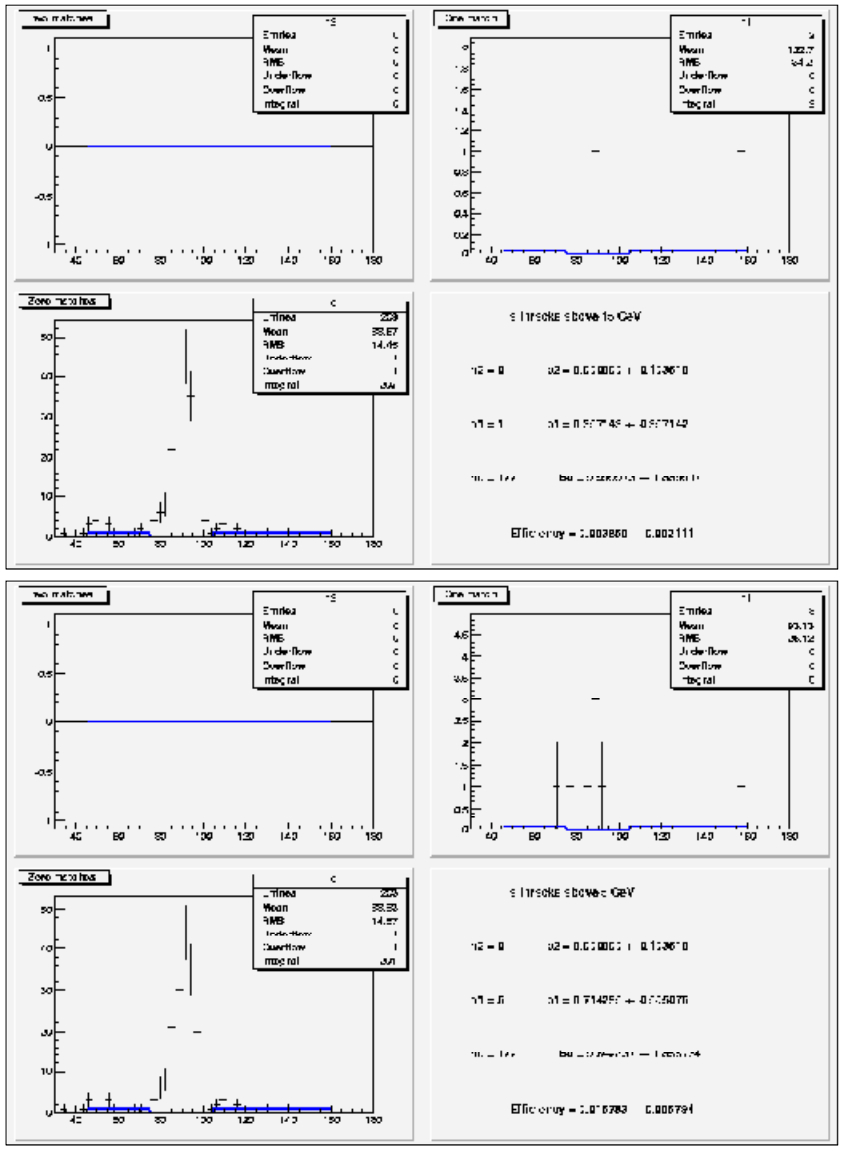
2D tarcks > 5 GeV

N2 =153 b2=4.5±1.6
N1 = 19 b1=3.8±1.5
N0 = 6 b0=2.4±1.2

Eff = 0.931 ± 0.018

p13+patched HTF: FAKES





Efficiency

	3D tracks, pT>15GeV	3D tracks, pT> 5GeV	2D tracks, pT>15GeV	2D tracks, pT> 5GeV
p13	59.7± 3.0	62.9± 3.0	86.2± 2.3	92.6± 1.9
p13 patched HTF	71.1± 2.8	74.8± 2.7	87.4± 2.1	93.0± 1.8
p13 patched HTF FAKES	0.4 ± 0.2	1.1 ± 0.5	0.4 ± 0.2	1.7 ± 0.7

Summary

- Axial tracks proved to be quite usefull for analyses with high pT electrons and photons:
  - $P(e \rightarrow \gamma) = 0.069 \pm 0.018$
  - $P(\gamma \rightarrow e) = 0.017 \pm 0.007$
- May be useful for analysis of stereo inefficiencies
- There seems to be a drop in efficiency from p11 TARC to p13…

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